

REMARKS

The Examiner's Office action mailed October 22, 2002, has been reviewed. In response thereto, the Applicants have submitted a Request for Continued Examination and this Amendment.

Claims 1-11, 21, 23, and 26-56 have been cancelled. Independent claims 24 and 25 have been amended. New claims 57-78 have been added. The amendments to the claims contained herein contain no new matter. In view of these amendments and the following arguments, Applicants respectfully submit that the application is now in condition for allowance.

Claim Rejections - 35 U.S.C. § 102

The Examiner rejected claims 1-4, 6-11, 21, 23-45, and 47-56 under 35 U.S.C. § 102(b) as being anticipated by Alft (U.S. 6,308,787). As mentioned above, claims 1-11, 21, 23, and 26-56 have been cancelled. Independent claims 24 and 25 have been amended.

Independent claim 24, as amended, is directed to a method for using a horizontal drilling machine having a plurality of automated functions and comprising a drill string to which an underground tool is attached. The method comprises axially advancing the drill string so as to move the underground tool along at least a portion of the selected path, while automatically operating at least one of the plurality of automated functions, wherein, when the underground tool is to be advanced in a straight line, the drilling machine is operated by automatically rotating and thrusting the drill string until a change of direction is required or the drill string must be lengthened. Further, when the underground tool is to be advanced in a particular direction, the drilling machine is operated by automatically rotating the underground tool to a desired roll orientation and advancing the drill string forward with the underground tool at the desired roll orientation for a predetermined distance or until the drill string must be lengthened.

Alft discloses use of a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the drive system may include a rotation motor and a thrust pump for advancing the drill string. Nowhere, however, does Alft describe or suggest the steps required to automatically control direction of an underground tool. Alft does not disclose use of the machine where an underground tool is advanced in a straight line by automatically rotating and thrusting the drill string *until a change of direction is required or the drill string must be lengthened*, as required by amended claim 24. Further, Alft does not describe or suggest use of the machine to advance the underground tool in a particular direction by automatically rotating the underground tool to a desired roll orientation and advancing the drill string with the tool at the roll orientation *for a predetermined distance or until the drill string must be lengthened*, as required by amended claim 24. Rather, Alft is void of particular discussion or suggestion of how an underground tool is automatically advanced and steered, as is claimed in Applicants' claim 24. Thus, claim 24, as amended, is not anticipated by Alft, and the § 102(b) rejection of this claim must be withdrawn.

New claims 72-78 are dependent claims, depending directly or indirectly from independent claim 24, and contain all of the limitations thereof. Each of these claims identifies further steps for use of the horizontal drilling machine that Alft does not disclose or contemplate. Consequently, these claims are also allowable over Alft.

Independent claim 25, as amended, is directed to a horizontal drilling system comprising a horizontal drilling machine having a plurality of automated functions and a machine control system. The machine control system comprises a plurality of sensors and a main control circuit. At least one of the plurality of automated functions is selected from the group comprising a pipe handling function, a power management function, a guidance control function, a fluid control function, and a tracking function. Further, claim 25, as amended, specifically identifies sensors included in the plurality of sensors, depending on which automated function is selected. For example, when the automated functions comprises the power

management function, the plurality of sensors comprises an engine speed monitor, a thrust circuit input sensor, a rotation circuit input sensor, and a fluid circuit input sensor.

As discussed above, Alft discloses a horizontal drilling system having a drilling machine, drill string, a drive system, a plurality of sensors, and a central processor. Alft indicates that the processor may operate parts of the drilling system. Nowhere, however, does Alft describe or suggest the particular sensors that are required to automatically operate the drilling machine, as is claimed in Applicants' claim 24. Furthermore, there is no description or suggestion of the properties of the machine operation that the sensors detect. Alft does not disclose, for example, that when the guidance control function of the machine is automatically operated, a thrust circuit output sensor, a rotation circuit output sensor, and a carriage position sensor are part of the system, as claimed in Applicants' claim 25. Nor does Alft suggest that sensors are needed to monitor the thrust applied to the drill string, the rotation applied to the drill string, or the position of the carriage, so that the guidance control of the machine can be automatically controlled, as Applicants' claim 25 requires. Rather, Alft contains no discussion or suggestion of the particular sensors needed and machine properties sensed in order to automatically operate the particular functions of the drilling machine. Therefore, claim 25, as amended, is not anticipated by Alft, and the § 102(b) rejection of this claim must be withdrawn.

New claims 57-71 are dependent claims, depending directly or indirectly from independent claim 25, and contain all of the limitations thereof. These claims identifies further sensors needed to automatically operate the horizontal drilling machine, or properties of the main control circuit, that Alft does not disclose or contemplate. Consequently, these claims are also allowable over Alft.

Claim Rejections 35 U.S.C. § 103

The Examiner rejected claims 5 and 46 as unpatentable under 35 U.S.C. § 103(a) over Alft in view of Terry et al., U.S. Pat. No. 6,296,066. Claims 5 and 46 have been cancelled and the rejection is therefore believed to be moot.

Applicants submit that the application, as amended herein, now is in condition for allowance. A Notice of Allowance courteously is solicited. In the event that there are any questions or comments concerning this amendment or the application, the Examiner is invited to contact the undersigned.

This is intended to be a complete response to the Office Action mailed October 22, 2002.

Respectfully submitted,



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